Assembled Chemical Weapons Assessment Program

Chemical Agent Air Monitoring Concepts

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Purpose of Chemical Agent Air Monitoring

- Provides protection to the worker, environment, and general public
- Alerts the operator to potential processing problems
- Integrates with automatic waste feed cut-offs
- Provides historical information

Current Monitoring Technologies

- Near-real time (NRT) monitoring devices
  - Automated devices placed throughout the facility
- Depot Area Air Monitoring System
  - Automated sample collection system collocated with Near-real time systems and located at other areas within the plant and facility boundary for historical documentation

Near Real-Time Monitoring Technologies

- Near-Real Time Monitoring Devices
  - ACAMS
  - MINICAMS
  - Agilent 6850
- Designed to be robust and meet the U.S. Army requirement of providing a response within 15-minutes
- Detects HD at 0.0006 mg/m^3


ACAMS


MINICAMS


Agilent 6850

Near Real-Time Monitoring Technologies (Concluded)

- Provides audible and visual alarms
- Real-time data recordings
- Coupled with Depot Area Monitoring System (DAAMS) for confirmation
- Monitors large range of monitoring levels in various atmospheres:
  - Toxic area monitoring (process indicator)
  - Non-toxic areas (worker protection)
  - Stack monitoring (high temperature and moisture)

Depot Area Air Monitoring System (DAAMS) Technology

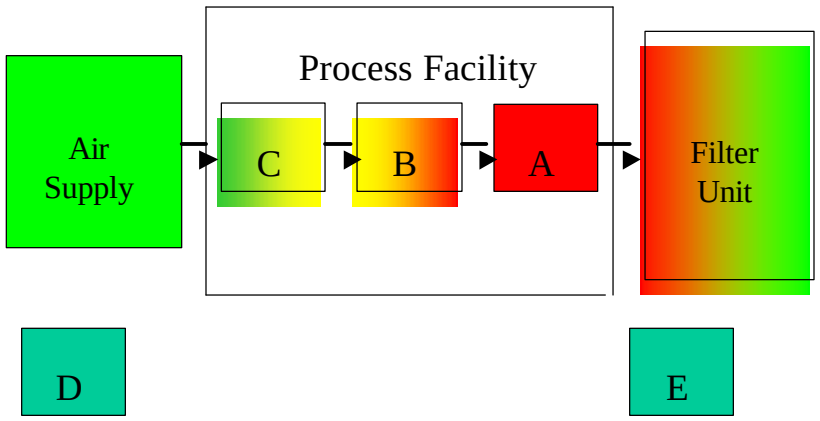
- Uses porous solid sorbent technology (Tenax)
- Tenax provides:
  - High affinity for HD
  - High thermal stability
  - Low sorbent bleed and excellent desorption capabilities
- Functions both as historical (Depot Area Air Monitoring System (DAAMS) only) and confirmation (NRT/DAAMS) systems

- Capable of detecting a wide range of monitoring levels (General Population Limit [GPL] to Allowable Stack Concentration [ASC] and higher)
- Multiple samples capable of being collected (redundant)

General Monitoring Concept

- Locate sample collection points at areas where, if present, chemical agent will most likely be detected.
- Smoke test or Sulfur Hexa-fluoride (SF6) is used to determine optimal location(s) within facility.
- Air modeling used to located perimeter (facility boundary) sampling points.
- Types and levels of monitoring are tied to ventilation category classifications
  - Category A
  - Category B
  - Category C
  - Category D
  - Category E

Ventilation Categories



Category "A" Areas

- Toxic process areas under negative pressure
  - Liquid and vapor contamination
- Monitoring Type (Near-real Time only)
  - Known contamination present
  - No Near-real Time (NRT) confirmation needed
  - Process indicator
- Monitoring Level
  - Maximum Permissible Level (100 mg/m^3)
  - Personnel in Occupational Safety and Health Administration (OSHA) Level A PPE

Category "B" Areas

- Toxic processing areas under negative pressure
  - Usually vapor contamination only
- Monitoring Type (Near-real Time only)
  - Known contamination present
  - No Near-real Time confirmation needed
  - Process indicator
- Monitoring Level
  - Maximum Permissible Level (100 mg/m^3) or Gross Level Detection (0.2 mg/m^3)
  - Personnel in Occupational Health and Safety Administration (OSHA) Level A, B, or C PPE

Category "C" Areas

- Work area under negative pressure
  - Low agent vapor hazard
- Monitoring Type (Near-real Time with Depot Area Air Monitoring System)
  - Worker protection
  - Near-real Time confirmation needed
  - Historical documentation
- Monitoring Level
  - Time Weighted Average (0.003 mg/m^3)
  - Personnel in Occupational Health and Safety Administration (OSHA) Level D PPE

Category "D" Areas

- Work area under ambient pressure
  - Low agent vapor hazard
- Monitoring Type (Depot Area Air Monitoring only)
  - Historical documentation
- Monitoring Level
  - Time Weighted Average (0.003 mg/m^3)

Category "E" Areas

- Work area under positive pressure
  - Negligible vapor hazard
- Monitoring Type (Depot Area Air Monitoring System only)
  - Historical documentation
- Monitoring Level
  - Time Weighted Average (0.003 mg/m^3)

Emission Source Monitoring

- Emission Source Points:
  - Carbon filters (midbeds and stacks)
  - Depot storage areas
- Depot storage area monitoring is the responsibility of the Depot

Process Stack Monitoring

- Monitored with Redundant Near-real Time systems with collocated Depot Area Air Monitoring System
  - 2-Near-real Time systems 50 percent offset from each other
  - 1-Near-real Time system is a backup for the 2-offset systems
- Monitoring level
  - Allowable Stack Concentration (0.03 mg/m^3)
- Integrated into the automatic waste feed cut-off

Carbon Filter Monitoring

- Selected midbeds and stacks are monitored
- Monitoring Type(s)
  - Near-real Time and Depot Area Air Monitoring System
- Monitoring Level
  - Time Weighted average (midbeds and stack)

Perimeter Monitoring

- Located at strategic predetermined points around the facility boundary (air modeling based)
- Monitoring type:
  - Depot Area Air Monitoring System only
- Monitoring level:
  - General Population Limit (0.0001 mg/m^3)

Additional Monitoring

- Additional monitoring locations may be established:
  - Process monitors (e.g. ducts, reactors, etc.)
  - Emergency response (mobile Near-real Time systems)
  - XXX certification
- Monitoring levels may vary depending on the need:
  - Engineering control level for process situations (approx 50 Time Weighted Average [TWA])
  - Time Weighted Average [TWA] for emergency response and XXX certification